Growth of Three Species of *Acmaea*

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(1 Text figure)

IN CONJUNCTION with a more general investigation of *Acmaea digitalis* ESCHSCHOLTZ, 1833 (FRANK, 1965), we have observed changes in shell length of a considerable number of individually marked limpets belonging to several species. Specifically the data reported here are from 668 *A. digitalis*, 140 *A. paradigitalis* FRITCHMAN, 1960 and 16 *A. pelta* ESCHSCHOLTZ, 1833, measured in June 1963 and again in June 1964. Maximum shell length was determined to the nearest tenth millimeter using vernier calipers.

The animals are from a single rock inside Coos Bay, Oregon. However, since this rock exhibits a considerable moisture and insolation gradient, the data probably approximate average growth for these species in this region. Certainly the species differences they reveal are general. Unfortunately the animals can not be separated by sex. There are indications that, in *Acmaea digitalis* at least, any difference in growth rate of the sexes must be very small.

Table 1 presents the data for the two species for which this can be done as a size-specific frequency distribution. It is evident that *Acmaea digitalis* of all sizes grow faster than do *A. paradigitalis*. It may be of some interest that this latter species (FRITCHMAN, 1960) was first distinguished by us from *A. digitalis* by its slower growth rate as well as its smoother shell. For both species absolute growth of the shell decreases with size in a non-linear manner. Although variability is quite great, the data show enough precision in their means to permit critical examination of various theories of mollusk growth (e. g. VON BERTALANFFY, 1957).

From the table and from the data on *Acmaea pelta*, Figure 1 has been constructed by graphic integration. It is intended primarily to furnish a visual index to the relative growth of the three species. The curve is least precise for *A. pelta*, and is not particularly useful as a means of determining age of shells for the other species either.
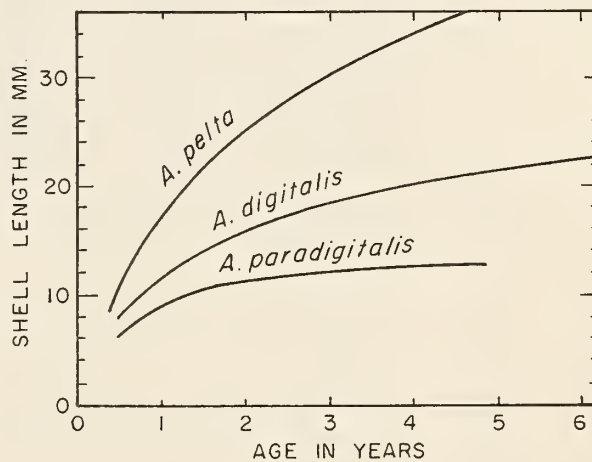

Figure 1: Average size as a function of age for three species of intertidal limpets
(1963 - 1964, Central Oregon Coast)

This is because of the large standard deviations illustrated in the table. Moreover, since we are unable to identify or mark very small limpets, the early portions of the growth curves are largely conjectural. No implications regarding longevity should be drawn from the curves. From our observations, *A. digitalis* occasionally reaches 6 years and *A. paradigitalis* 4 years of age.

ACKNOWLEDGMENTS

Table 1

Annual change in shell length of *Acmaea digitalis* and *Acmaea paradigitalis*

	A. digitalis			A. paradigitalis		
IL mm	MC mm	N	SD	MC mm	N	SD
8.0				2.83	4	0.77
8.5	6.78	5	1.24	2.32	9	1.05
9.0	6.95	15	0.94	2.42	26	1.46
9.5	6.23	29	1.65	2.64	19	1.57
10.0	6.16	50	1.21	1.86	28	0.78
10.5	5.74	52	1.35	1.81	22	1.11
11.0	5.69	62	1.05	1.08	13	0.45
11.5	5.36	58	1.40	0.79	7	0.47
12.0	5.24	42	1.22	0.60	5	0.72
12.5	4.47	26	1.38	0.59	7	0.71
13.0	5.12	26	0.93			
13.5	3.89	17	1.27			
14.0	3.99	10	1.28			
14.5	3.73	25	1.26			
15.0	2.97	27	0.77			
15.5	2.56	16	0.65			
16.0	2.62	27	1.24			
16.5	2.21	21	1.15			
17.0	2.62	20	0.91			
17.5	2.37	14	0.89			
18.0	2.13	21	0.71			
18.5	1.67	20	1.16			
19.0	1.63	18	1.43			
19.5	2.14	10	0.97			
20.0	1.27	12	0.94			
20.5	1.90	12	1.23			
21.0	1.14	8	0.98			
21.5	1.57	3	0.74			
22.0	1.26	5	1.09			
22.5	1.14	9	0.89			
23.0	0.55	2	0.24			
23.5	0.90	3	0.73			
24.0	0.50	3	0.78			

IL = initial length; MC = mean change; N = number
SD = standard deviation

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